

How to Write a Lab Report for AP Biology

TITLE: The title should summarize the subject of the lab.

The Role of Bacteria in Plant Nitrogen Uptake

INTRODUCTION: Introduce your topic and any necessary background knowledge as it relates to your hypothesis. Discuss the purpose of the lab.

NULL HYPOTHESIS: There will be no difference in ____ between ____ and ____.

Plants serve as the basis for most food and oxygen production in our society. Therefore, a good understanding of their nutritional needs is necessary if we are to sustain important resources, namely oxygen and crops. Nitrogen is vital for plant nutrition, being a major component of biomolecules such as proteins and nucleic acids. Most plants grow successfully in the presence of bacteria, but it is not known how bacteria are of assistance. It is possible that the bacteria play a role in nitrogen uptake in plant roots. Accordingly, the purpose of this study is to test the null hypothesis: There will be no difference in nitrogen uptake between plants with bacteria and plants without bacteria. If a statistically significant difference is found among the two groups, then the null hypothesis will be rejected and an alternate hypothesis will be accepted.

METHODS: List each step sequentially so that someone else could repeat your experiment without questions. Must be written in **3rd person past tense**. Be sure to list all materials as specific as you can.

- 1. 6" pea plants obtained from Carolina Supply Company were potted in standard Scott's soil.*
- 2. One pea plant received *Dolius asumpti* bacteria placed in the soil near the base of the pea roots and left to culture for 3 days; the other pea plant served as the control so received no bacteria and was left to sit for 3 days.*
- 3. Root tips were severed with a 1" razor blade and prepared for microscope analysis.*
- 4. The slides were observed using a Nikon 8740 SEM.*

RESULTS: Summarize **what** happened, NOT WHY IT HAPPENED.

Tables/graphs/pictures etc. should be labeled so they may be referred to properly in the summary.

Figure 1 shows 1ug/g nitrogen present in the root sample without bacteria while Figure 2 shows 13ug/g nitrogen in the root sample with bacteria.

Figure 1: Plant without bacteria

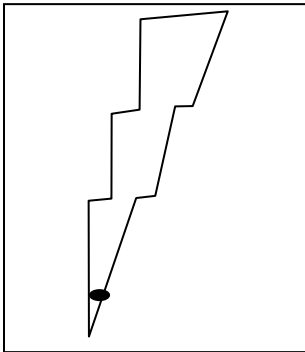
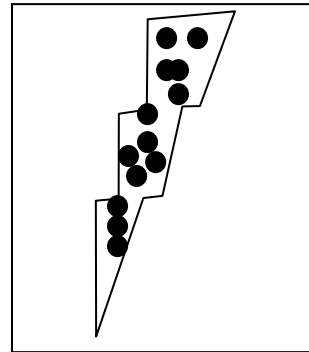


Figure 2: Plant with bacteria



Data tables should be labeled with a title and all units (seconds, milliliters, etc.) must be noted.

Example - Data Table 1: Rates of nitrogen uptake from soil

Graphs and images are labeled as “Figures” in lab reports.

ANALYSIS: Restate the hypothesis and then summarize how your results either supported or refuted your null hypothesis. You must use a **statistical test** to reject or accept your null hypothesis. Propose explanations for why the data turned out the way it did.

The null hypothesis of this experiment was that there would be no difference in nitrogen uptake between plants with bacteria and plants without bacteria. The results showed a clear increase in nitrogen for the plant with bacteria. To test the significance of these findings, a Chi Square analysis was performed. According to the Chi Square statistic, the null hypothesis should be rejected, leading us to accept the alternate hypothesis that bacteria do play a role in plant nitrogen uptake. It is highly likely that bacteria break down matter in the soil which facilitates the uptake of nitrogen from the soil.

****The 2 main statistical tests we will use are the t-Test and the Chi Square**

t-Test: Used for comparing 2 or more data sets

Chi Square: Used for comparing data sets that are observed values versus expected values

CONCLUSIONS: Sources of experimental **error** must be discussed along with **limitations (shortcomings)** of your study and possible **extensions** that could account for those limitations. Finally, discuss some useful applications of your lab findings.

Even though the results support the alternate hypothesis, this study cannot account for all plant species. A possible extension of this experiment could be to test multiple plant species to see if there is consistency in nitrogen-bacteria relationships among various plants. Understanding methods for increasing plant productivity is vital for our economy for producing crops; therefore, this study shows that bacteria are a crucial part of a plants health.

Lab Report Rubric

Title	5 Accurate summary of experiment	3 Summary not specific enough	0 Not provided
Introduction	15 A background on the subject is given and purpose listed.	8 Information not related to hypothesis, purpose not included.	0 Not Provided
Hypothesis	5 Correct format and parallel to Introduction & title	3 Not in correct format (if...then...) or related to intro./title	0 Not Provided
Methods	15 All materials listed. All procedures listed sequentially, correct format and easily repeatable	8 Some materials or procedures missing; not sequential; incorrect format; difficult to understand	0 Not Provided
Results	20 Visuals included & labeled correct; Summarized concisely	10 Visual is messy, incorrect, not labeled/no titles. Summary not provided.	0 Not Provided
Analysis	20 Statistical test supports/refutes hypothesis. Explanations provided	10 Analysis discussed but statistical test is not included. Explanations not provided	0 Not provided
Conclusions	20 Errors & Extensions discussed logically. Useful application of findings discussed	10 Errors not discussed. Extensions not discussed. Applications not discussed	0 Not provided